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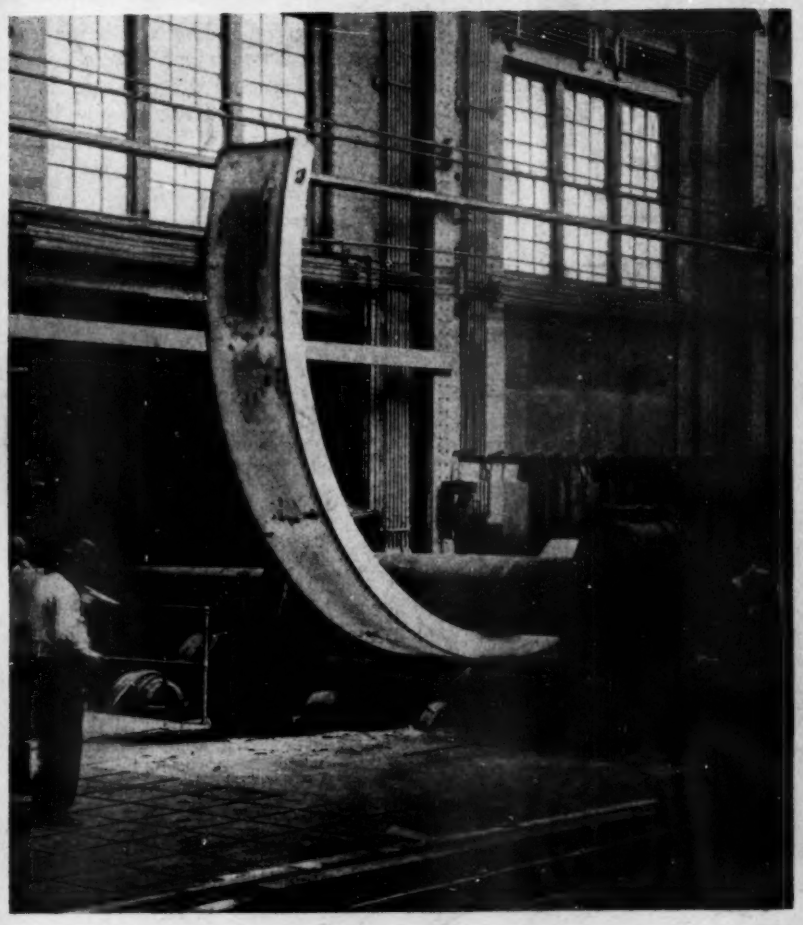
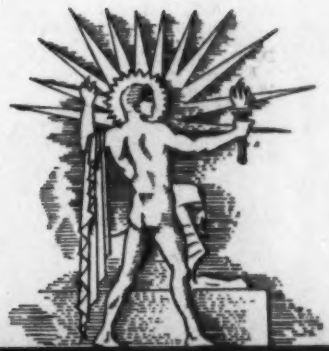
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





JANUARY 26, 1935

Fifteen-Ton Hoop

See Page 61

A SCIENCE SERVICE PUBLICATION

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The Weekly Summary of Current Science

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SCIENCE SERVICE

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DO YOU KNOW?

Government chemists have found a cheap way of fireproofing canvas.

In six years, Moscow has had 1,630,000 people added to its population.

The quick freezing method of preserving American cheese is being tried with encouraging results.

Canadian scientists are testing ways of tanning buffalo skins, for use in coats and robes.

Jamestown Island, site of Captain John Smith's colony, is being explored systematically for historic relics by National Park Service archaeologists.

Navaho weavers are finding it harder to sell rugs and blankets decorated with the old Indian swastika symbol, which is also symbol of Nazi Germany.

Tropical palms produce over a billion pounds of palm sugar each year.

All maples have sweet sap, but some species contain too little sap or sugar to be worth tapping.

The milk industry may yet use airplanes to transport its product to city markets, predicts one agricultural economist.

Bamboo shoots grow with almost magic speed, but only after a grove is ten years old or older and the underground growth is established.

One indoor weather expert says that a room is best adapted for human use when the temperature is 68 degrees Fahrenheit, the relative humidity 40 to 50 per cent., and the air in slow circulation.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the articles.

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SEISMOLOGY

Was the Grand Canyon of Arizona formed by earthquake action? p. 57.

VITAL STATISTICS

Which has the lower birthrate, France or Germany? p. 56.

AVIATION

Long-Distance Plane Flights Will Go to High Altitudes

New Type Planes With Superchargers and Variable Pitch Propellers Make Possible 69 Per Cent. Speed Increase

HIGH-ALTITUDE flying is the only apparent way of reaching the high cruising speeds demanded of present passenger aviation and at the same time obtain economical operation, says W. Bailey Oswald of the Douglas Aircraft Co. in *The Journal of the Aeronautical Sciences* (Jan.)

The future promises high-speed flying at altitudes up to 40,000 feet with costs equal to or less than those of present day low-altitude flights, predicts Mr. Oswald.

In his extensive report showing that high-altitude flights are sound both from the engineering and economy sides, Mr. Oswald indicates that by using the newest type planes with superchargers and variable pitch propellers it is possible to obtain a 69 per cent. increase in cruising speed with an increase of only 6 per cent. in operating costs. This high ratio of speed gain to operating cost increase is possible for planes cruising at 40,000 feet.

Superchargers For Passengers, Too

Superchargers, compressing the rarefied air of stratospheric heights to densities usable by motors and passengers alike, is the key to high-altitude flying, reports Mr. Oswald. The capacity of present superchargers need only be increased some 15 per cent. to make possible flights at 40,000 feet. Such equipment will serve adequately the engines and at the same time will give a sufficient supply of air to passengers and pilots. In fact, he indicated, once the problem of supercharging a motor at 40,000 feet is solved the problem of passenger oxygen supply will be solved also.

Even the heating of the air from its average temperature of 55 degrees below zero will be taken care of, for the compressing of the atmosphere automatically warms it up to temperatures as high as 300 degrees.

When airlines use a high-altitude, ten-hour flying schedule from New York City to Los Angeles, the cost per passenger may be as low as $100. A fare of $125 to the passenger would make such a problem economically sound, he says.

Discussing high-altitude flying from the passenger's viewpoint, Mr. Oswald said, "In high-altitude flying some passengers might find the darkened sky and reduced visibility of the earth objectionable; but high-altitude flying must be regarded purely as a means of transportation. Sightseeing will have to be done at low altitude with all the attendant evils."

High flying makes for safer flying, Mr. Oswald reports, for from an altitude of 40,000 feet an airplane can glide 120 miles and take an hour to do it. It might even be possible, in many cases, for mechanics on the plane to make the necessary repairs during this hour of descent.

Flights at high altitudes are economically feasible for distances greater than 600 miles, the aviation authority reports. For shorter trips the plane would spend all its time gaining altitude and then descending. The result would only be about the same as a level flight at half the maximum altitude.

By a study of existing aviation equipment Mr. Oswald shows that the trend to increase speed at lower altitudes by increasing engine horsepower is a losing fight. High altitudes for flying with suitable equipment is the economical solution of the problem.

What will such high flying cost the airlines? Figured on a plane costing $40,000 the cost of additional supercharged equipment to reach 20,000 feet cruising altitude is $3,000. To reach 40,000 feet for cruising, equipment would cost $6,000.

"Although this increase in cost may seem large, the final operating cost of the airplane will be affected but little since depreciation of flying equipment forms a relatively small portion of the total operating cost," reports Mr. Oswald.

For flights as long as 1,500 miles the necessary of carrying great fuel loads cuts the pay load. This might be overcome by refueling in the air.

"Refueling in the air certainly deserves serious consideration for high-altitude flights," Mr. Oswald concludes.

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GREAT ALTAR

Visitors to the exhibit of the Carnegie Institution are viewing one of the finest sculptures ever found in the Mayan area, an altar from Quirigua. This was an important ceremonial center of what is now Guatemala at about the time Rome was succumbing to the Goths.

PHYSICS

Six Hundred Billion Volt Cosmic Rays Predicted

Great Energy Can Not Come From Exploded Atoms, Says Prof. Arthur H. Compton, Now in England

WHERE DO the enormous energies observed in cosmic rays come from? Newest of all problems in atomic science is to figure out how the ray energy is released.

Cosmic rays have been observed, for example, so energetic and piercing that they pass through nearly 2,000 feet (600 meters) of seawater.

Prof. A. H. Compton, American Nobelist now at Oxford University, England, has published an estimate *Nature* (Jan. 12), that some of the most piercing cosmic rays have energies of 600,000,000,000 electron volts.

Such great evidences of energy, Dr. Compton points out, cannot come from the release of the energy equivalent to the mass of most atoms known on earth.

It would require atoms from 100 to 1,000 times as heavy as those of hydrogen to produce such rays by exploding. Heaviest of all atoms on earth are those of uranium, weighing only about 238 times as much as hydrogen.

Dr. Compton pictures such rays as primary ones coming in from outer space and not as secondary ones created in the earth's atmosphere. They cannot, definitely, be photons of radiations.

Photons are the little so-called packets of radiation, of which ordinary light is only one kind, which have been suggested as the cause of cosmic rays. Dr. Compton's 600,000,000,000 volt cosmic rays, by contrast, are thought to be electrified particles.

Those scientists who like to retain the idea of cosmic rays being photonic in nature have speculated on complex chain reactions within matter as cosmic rays pierce it. Such chain mechanisms seek to explain how super-penetrating power of the rays is possible with photons far less energetic than observations would indicate.

Just before Dr. Compton's report, and also in *Nature*, H. J. Bhabha, Indian physicist now at Cambridge, England, described such a hypothetical chain mechanism.

Physicist Bhabha pictures an incoming cosmic ray photon striking atoms of matter and turning into a neutron with little loss of energy. The neutron, like a microscopic billiard ball, flies forward with great energy and with little ionizing power. In traveling through a yard of lead, Mr. Bhabha estimates, some 25 such interchanges between photons and neutrons would occur; the one turning into the other alternately.

This scheme would lower materially the loss of energy as a cosmic ray goes through matter, for about half the time it spent in the material it would be in the form of neutrons and lose little energy. Thus the final power of the ray, as measured by its ionization, would be much more than its real energy if such a mechanism were not acting.

Says Dr. Compton discussing such chain mechanisms, "The apparent absence of any possible mechanism whereby such a chain reaction might be effected seems sufficient to rule out such suggestions."

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GEOGRAPHY

U. S. Largely Unmapped; Completion of Work Urged

AMERICA may not be an unmapped wilderness any longer, but it is still unmapped to a very large extent. So much is indicated by a new report of the National Resources Board on the subject of topographic mapping in the United States.

Only 26 per cent. of the 3,050,000 square miles in the United States proper can be considered adequately mapped, the Board states. An additional 24 per cent. has been mapped, but so long ago and with such unsatisfactory instruments that the work must be considered inadequate. The remaining 50 per cent. of the area, lying mainly in the Northwest, Midwest and South, is wholly without topographic mapping of any kind.

The Board has drawn up a plan for the completion of the national mapping task, which it estimates can be carried out in ten years. Based on the urgency of the need in various parts of the country, zones of first, second and third priority have been laid out. It has been estimated that the cost of this ten-year topographic mapping plan will be $117,531,000, which averages out to about eight cents an acre. Airplane photography is expected to speed the work and reduce its cost.

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BIOLOGY—AVIATION

Spores of Fungi Captured In Arctic Upper Air

HIGH over the arctic wastes, the air is charged with pollen grains, spores or fruiting bodies of fungi, and other microscopic witnesses of plant life, borne from afar on world-sweeping winds. Collections of these, made during the Lindberghs' Arctic flight last summer, have been subjected to long and careful examination, and are now described by Fred C. Meier of the U. S. Department of Agriculture (*Scientific Monthly*, January).

Col. and Mrs. Lindbergh were not the first collectors of living dust in the upper air. Many other scientists, including Mr. Meier himself, have emulated the old woman of the nursery rime who went aloft "to sweep the cobwebs out of the sky," and some of them have captured germs of life at altitudes up to nearly 20,000 feet. The outstanding importance of the Lindbergh flight-collections are that they represent the "farthest north" of high-altitude life.

The collecting began as soon as the Lindberghs left the coast of Maine, and continued as they soared over Labrador and into the Arctic, over Davis Strait and the desolate ice fields of extreme northeastern Greenland, and thence across the northern end of the Atlantic, finally to Denmark.

The glass collecting slides, suitably coated with a sticky substance to catch whatever minute particles might be afloat high in the air, were elaborately protected inside a carefully worked-out protecting case termed for convenience the "sky hook." It was so arranged that the slides were kept sterile until the moment for most favorable exposure, then opened for the desired period—usually upwards of an hour—and then

closed and tightly sealed to prevent any other objects from leaking in. The sealed carriers were sent to Washington, where Mr. Meier has examined them.

As was expected, the spores, pollen grains, bits of fungal thread and scraps of non-living material were most numerous at the two ends of the long flight, and scarcest over the high-Arctic middle of the horseshoe-shaped coarse. But nowhere did the slides fail to show up some hundreds of scientific trophies.

Some of the fungus spores are recognizable as familiar genera, a part of which are of fungi that cause plant diseases. Others are as yet unrecognized, but botanical specialists are at work on them, as well as on the pollen grains, in an endeavor to identify as many as possible of the plants that launched their propagating bodies on such a long air voyage.

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PHYSIOLOGY

Sleeps Three Days at Time; Woman Puzzles Doctors

STRANGE sleeping habits of Miss Eleanor Coburn, 93-year-old American-born resident of Wimbledon, have puzzled physicians.

For approximately three days Miss Coburn sleeps almost continuously. For another three-day period she remains awake almost continuously, although lately she has had a little sleep during her waking periods also. Interviewed in London just after she had awakened from fifty-four hours of sleep, she seemed extremely alert, intelligent and vivacious.

This pink-cheeked old lady, who will be 93 next March 12, is a picturesque figure in the bonnet and mittens of grandmother's or great-grandmother's time. She was a brilliant amateur pianist and now conducts an extensive correspondence with friends in many parts of the world, including America. She formerly lived in Boston, Mass., but left the United States finally over fifty years ago.

She started her strange method of sleeping and waking in alternate three-day shifts about four years ago, soon after becoming an invalid. Her sleeping habits are a mystery to her physician, as she apparently suffers from no mental or physical disease, although she shows a gradually increasing physical weakness.

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PHYSICS

"Shadow" of Earth Explains Cosmic Ray Variation

CONFIRMATION for the idea that cosmic rays consist, in a large measure, of charged particles streaming down on the earth from outer space was presented before the Franklin Institute in Philadelphia by Dr. Thomas H. Johnson, assistant director of the Bartol Research Foundation, Swarthmore, Pa.

Dr. Johnson recently returned from a cosmic ray expedition to Mexico, where his party climbed the 14,000-foot peak of Nevado de Toluca, fourth highest mountain in the country.

Using heavy and elaborate apparatus which measures the intensity of cosmic radiation as it varies from zenith down to horizon, Dr. Johnson detected a greater intensity from the south than from northern directions. These results tie in with his previous discovery that cosmic ray intensity also is greater from the west than the east. Both results are explainable by previously developed cosmic ray theories of Prof. Carl Stoermer, Dr. P. S. Epstein and Abbé Lemaître (developer of the expanding universe concept) and Dr. M. S. Vallarta.

To explain the north and south difference of cosmic rays is the concept that the earth casts a magnetic shadow. Says Dr. Johnson, "Due to the magnetic field and to the fact that the rays are electrically charged, the orbits are curved, and, if the earth were transparent to cosmic rays, much of the intensity which would be observed at the earth's surface would be due to rays which had previously been inside the earth. From inside the earth they would be turned back by the magnetic field into the region above the earth where they would again be turned down to the observer.

"Rays traveling such orbits as these are, of course, stopped at their first entry into the earth's surface and their absence on the remainder of their hypothetical path, appears as a complete shadow from the directions below the horizon and as a partial shadow from directions above the horizon," he added.

"The partial shadow is the more dense, according to experiment and theory, from northerly directions than southerly directions in the northern hemisphere."

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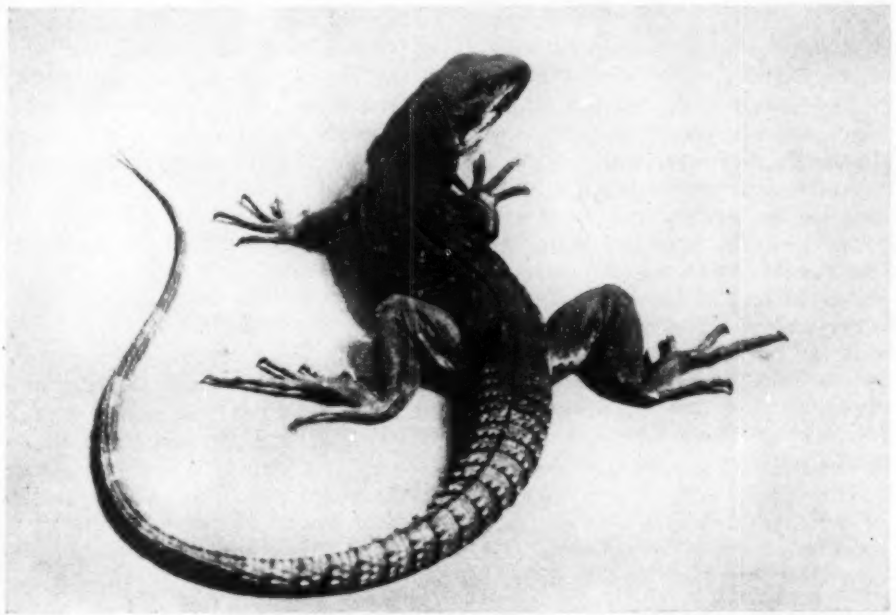

STOWAWAY *Cornelia Clarke Photo.*

A grocer in Grinnell, Iowa, was unpacking a bunch of bananas. He heard a slight rustling, and jumped back, expecting the conventional monstrous hairy spider; but what came out was this bright-eyed, harmless, vegetarian young iguana. From blunt nose to tip of tapering tail, "Iggy" is just an inch under two feet long.

PLANT PHYSIOLOGY

Upflowing Sap in Plants Pulls With Force of Tons

University of Chicago Scientists Calculate Tensions on Slender "Water Wires" in Plant Tubes

WATER, climbing hundreds of feet to the tops of the world's tallest trees, or a mere fraction of an inch in the lowly mosses at their roots, accomplishes this apparent paradox of flowing uphill because an ancient proverbial saying is not true. Water is not "as weak as water." Water, under proper conditions, comes close to being as strong as steel.

How strong water may be, under conditions faced every day by the living plants in which it flows, has been calculated by three University of Chicago scientists, Dr. Clyde Homan, Dr. T. F. Young and Prof. Charles A. Shull (*Plant Physiology, July,* 1934) They have found that a column of pure water under the low relative humidity which desert plants have to endure, can withstand, without breaking, a pull measureable in many tons per square inch. The same column, under the high relative humidity found in a tropical rainforest, may not need to withstand a pull greater than twenty pounds per square inch.

Model Simulates Plant

The apparatus models used in the Chicago measurements simulate roughly the conditions found in one of the fine tubes that carry water upward in a plant. One of the models consists of a cylinder, with its upper end closed by a firmly fixed membrane through which water can seep and evaporate. Into the lower end is fitted a piston, free to slide up and down, but arranged to permit no air to pass it. Hung beneath the piston is a weight, which can be increased or lightened at will.

The space between the top membrane and the piston is filled with water, out of which all dissolved air and other bases have been driven by boiling. This is a most imporant consideration, for dissolved air in water is like sulphur or other impurity in steel: it tends to collect in one place when stress is applied, forming a bubble which plays the part of a flaw and permits the column to break. The water, then, must be absolutely gas-free.

Using such an apparatus model, the air around the apparatus is assumed to be charged with larger or smaller quantities of water vapor, producing atmospheres with relative humidities ranging from nearly saturated (99.9 per cent.) down to a desert-air humidity of only 10 per cent. Water would then pass through the top membrane and evaporate, and the piston with its suspended weight would be pulled upward.

"Stromogenic Tension"

Then more weight may be applied until the pull of the weight exactly balances the upward pull due to the evaporation through the membrane. The upward motion of the piston would then stop; the weight at the bottom, plus an allowance for atmospheric pressure, is a measure of the pull due to evaporation through the membrane, under the relative humidity and temperature conditions at the time. This pull has been given the name "stromogenic tension."

According to the formula worked out by the three University of Chicago investigators, the stromogenic tension of a column of pure water, at 68 degrees Fahrenheit and 10 per cent. relative humidity, is in the neighborhood of 3,000 atmospheres. One atmosphere is 15 pounds per square inch, so that this tension equals 45,000 pounds, or 22.5 tons per square inch.

At the other extreme, the stromogenic tension at the nearly saturated condition of 99.9 per cent. relative humidity is only one and one-third atmospheres, or a mere 20 pounds per square inch. At the more usual relative humidities of 70 and 50 per cent., respectively, the tensions are of the order of 475 and 900 atmospheres, or roughly 3.5 tons and 7 tons, respectively, per square inch.

An apparatus more nearly approximating the physical set-up of a plant has also been used in the calculations. This interposes either a jell or a thick solution of chemical substances, with osmotic or "water-drawing" power, between the outer membrane and the water column, with a second, moveable membrane separating them. This jell or solution is a rough approximation of the interior of the leaf-cells, with their living jell of protoplasm and the thickened cell-sap inside.

The first discovery of the ability of a column of water to withstand a heavy tension was made over twenty years ago, by several European researchers. The recent studies at Chicago, however, have demonstrated a tension-resisting capacity in water far beyond any figure then reached or even thought possible. It not only accounts for the ability of the slender "wires of water" in the tubes of trees to pull themselves to the tops of the tallest trees now living, but leaves a margin of strength sufficient to lift water to nearly ten times their height.

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PHYSICS-BACTERIOLOGY

New Optical Method Aids Study of Bacteria

A NEW optical method of studying the early growth processes and metabolism of bacteria and other one-celled organisms has been developed by Dr. Harold Mestres, research associate in the Department of Public Health at Yale University. Dr. Mestres explained the working of a new densitometer for studying the number of bacteria by the amount of light a mixture of them in a solution will transmit.

With the instrument Dr. Mestres has been able to show not only that the growth of bacteria is quite different from older conceptions obtained by counting the growth rate at intervals, but has been able to follow the way in which bacteriophage controls growth of organisms. In addition the instrument will reveal the rapidity with which germicidal solutions stop the growth of organisms.

Taking a solution containing small organisms, growth can be traced, for as they grow larger and increase in number less light comes through the solution. Extinction of the light may even occur.

By measuring the transmitted light at intervals Dr. Mestres was able to show, what previous workers have suspected,

that during the first hour or two of growth the bacteria grow rapidly in size and do not greatly increase in number. Then, at a clearly defined time multiplication sets in and the organism population increases. Cell metabolism is therefore highest at the beginning of cell growth and not, as is generally said, after a period of lag.

The study of the action of bacteria shows the organisms growing steadily up to the time when the phage was introduced into the solution. Then quickly the solution begins to clear up and allow more light to pass through. This indicates that the phage is "eating up" or destroying the bacteria.

First work on the development of the densitometer and its optical technique of studying bacterial growth was undertaken while he was at Stanford University, Dr. Mestres stated. The work is now being continued at Yale, where Prof. C. E. A. Winslow is chairman of the department.

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PLANT PATHOLOGY

Blame for Eel-Grass Disease Laid on One-Celled Animal

HUNTERS on the Atlantic coast who have been unable to find any water-fowl to shoot at can address their woes to *Labyrinthula,* a microscopic, single-celled, parasitic animal, researches at the New Jersey Agricultural Experiment Station at Rutgers University have revealed.

Labyrinthula has practically ruined the pastime of many sportsmen by causing an epidemic wasting disease that has killed eel grass along the entire Atlantic coast and has thus destroyed or greatly reduced the principal food of geese, brant, certain species of ducks, and various economically valuable fish and mollusks, particularly scallops.

Charles E. Renn, Station microbiologist, who has been cooperating with the Woods Hole Oceanographic Institution, discovered that *Labyrinthula* causes the wasting disease while working under the supervision of Dr. S. A. Waksman, head of the Station's department of soil microbiology and a member of the Oceanographic Institution. Mr. Renn encountered a hitherto unreported spindle-shaped micro-organism in the diseased leaf tissue of the eel-grass. The organism occurred with such regularity and was so oriented in the tissues that it was immediately placed under suspicion as a parasite, and a study of the habits of the living form undertaken. Its true parasitic nature was established.

Mr. Renn's research demonstrated that *Labyrinthula* could penetrate eel-grass leaves and produce the wasting disease in from four to forty-eight hours. Affected eel-grass is weakened and made susceptible to the attacks of bacteria, fungi, and other parasitic organisms.

The recent outbreak of the wasting disease was reported as early as 1929, but not until 1932, when eel-grass was almost entirely destroyed along the Atlantic coast, was the seriousness of the ailment impressed upon sportsmen. There was some recovery early in 1933, but before the summer's end destruction of the eel-grass had again increased to an alarming extent. The same situation prevailed in 1934.

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ICHTHYOLOGY

Fresh-Water Fish Learn To Live in Sea Water

GUPPIES, mild little family-loving fish now much in vogue with amateur aquarists, have been turned into hardy, sea-faring "old salts" by Miss Gloria Hollister, research associate of the New York Zoological Society. Miss Hollister tells how she has been able to get guppies, which are normally fresh-water fish, to adapt themselves to life in full-strength sea water. (*Bulletin, New York Zoological Society,* Nov.-Dec.) Young fish have been born in the salt water, and both parents and offspring are still living.

Miss Hollister began by putting guppies into mixtures of fresh and salt water of various strengths. All the guppies continued to live when the mixture contained no more than 50 per cent. of sea water. In a 60 per cent. mixture 71 per cent. of the little fish survived. Even when their first experience with salt water was a 70 per cent. mixture of sea water with fresh, about a fifth of the guppies lived. But an addition of 75 per cent. or more of salt water to the fresh was too much for the guppies.

Miss Hollister then "acclimated" guppies by starting at the 50 per cent. level and increasing to larger and larger concentrations of salt until finally she had them living in perfect contentment in 100 per cent. sea water.

The new environment has not been wholly without effect on the guppies' behavior. They developed a behavior peculiarity which she calls "the spirals," a tendency to swim in a spiral track, sometimes going through the performance on their backs. They go into "the spirals" whenever they are startled, as by a sudden flash of light.

Miss Hollister has put several other fresh-water fish through a course of salt-water adaptation. She has also reversed the process, inducing certain salt-water fish to become used to fresh water. In one tank she has two fish species, one normally living only in fresh water, the other only in salt, swimming about together, both apparently quite comfortable and happy.

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CAPTAIN OF A WHALE

It looks like a sculpture of a grotesque little old man's head, but it is really the otic capsule, or bony ear-box, of a sperm whale, which houses not only the huge mammal's organs of hearing but the apparatus which controls his sense of balance, and thus his ability to get about in the sea. Its natural dimensions are about double those shown in the illustration. This specimen belongs to Dr. H. C. Bryant of the U. S. National Park Service.

PUBLIC HEALTH

Many Lives Saved By Care Of Mothers and Babies

OVER a hundred lives were saved in one Tennessee county during a five-year period as a result of adequate attention given to the health of mothers and children, it appears from the Commonwealth Fund's report of activities for the past year.

These hundred or more lives saved would have been taken by the various preventable diseases, such as diphtheria, smallpox, and the like, the Fund's officers found by comparing the country's record of deaths from these diseases during the periods 1924-28 and 1929-33. Since 1924 the Fund has been aiding public health and medical development in Rutherford county. During the past five years the county has maintained its own health department. Striking reduction in the number of deaths of mothers in childbirth and of children under two years of age has also been recorded during this period.

Improvement of medical and public health facilities in rural areas is one of the scientific activities aided by the Fund.

Science News Letter, January 26, 1935

GENERAL SCIENCE

Asks "Cut" of Athletic Funds for Research

RESEARCH in science should have at least a modest slice of the funds now lavished on athletics in universities, Dr. John M. Cooper of the Catholic University of America proposed. A "cut" of ten per cent. of the athletics budget, he suggested, would not be too much to be diverted to the support of research. Dr. Cooper laid his proposal before a round-table gathering of Catholic scientists attending the meetings of the American Association for the Advancement of Science.

"Notwithstanding our hard times, nearly all our colleges and universities manage to find fairly generous funds for intercollegiate athletics," Dr. Cooper said. "Only exceptionally are these large expenditures covered from gate receipts.

"Would not the real objectives of our institutions of learning be better attained if even ten per cent. of the money now being sunk annually in intercollegiate sports were shifted from the athletic budget to a research budget?

"Even $2,000 a year taken from a $20,000 athletic budget would provide grants in aid to departments and staff members for four or five modest research projects. Forty or fifty such projects completed and published in a ten-year period would, many of us believe, do more to draw desirable students and to gain academic status than twice as many brilliant victories by 'muddied oafs at the goals.'

"The supporting public in general and students in particular are more and more demanding, since the close of the jazz age, that academic shoemakers stick to their lasts, and that they sell shoes that wear, without embroidered shoelaces."

Science News Letter, January 26, 1935

PHYSIOLOGY

Hunger Gets Less as Time Between Meals Increases

HUNGER is often more pronounced just before a regular meal than after a fast of 24 hours or more, Dr. Robert N. Sanford found in research at the Harvard University psychological laboratories.

Observing the reactions of the human mind under various degrees of hunger, he found that the "food habit," food appetite, and biological requirements of the body in many cases were more important factors than the passage of time in determining a subject's attitude toward food.

According to the results of his experiments on more than 300 students, the passage of a long period of time tends to decrease rather than increase hunger, with most acute hunger present just before a regular meal. Two hours after the meal hunger decreases about 50 per cent., he found, and even from eight to 24 hours after eating, food interest is still less than just before a scheduled repast.

A group of 27 students voluntarily fasted for 24 hours, and although most of them showed considerable hunger, some showed extremely little food interest. These stated that even consciously, they felt little attraction for food, a result which corresponds to the fact that most people lose hunger in a prolonged fast, and that hunger does not affect some, even in a relatively short period of abstinence.

Science News Letter, January 26, 1935

IN SCIEN

ENTOMOLOGY

Mosquitoes Lay Eggs Without Eating Blood

BLOODTHIRSTINESS on the part of the female mosquito is usually accounted for by the claim that she cannot lay her eggs without at least one rich meal of human or animal blood. This belief is now contested by several investigators, the most recent of whom are J. F. Marshall and J. Staley, of the British Mosquito Control Institute, (*Nature, Jan.* 5).

They have found it possible to breed one of the commonest and most troublesome of mosquito species on a no-blood regimen, by keeping well-warmed the water in which their "wigglers" or larvae grow, and supplying the larvae with a copious diet.

Science News Letter, January 26, 1935

VITAL STATISTICS

Birthrate Decline Is World-Wide

WORLD-wide decline in birthrate, with a much sharper than average fall in the United States, is seen by statisticians of the Metropolitan Life Insurance Company. While the fall has been going on for more than half a century, it has become much more rapid in the last five years.

Rumania is the only country with any sign of a rising birthrate since 1928, but the rise is slight and may not be real, since birth registration has improved greatly in Rumania in recent years. Chile had the largest drop in birthrate, Venezuela had the smallest. In 1932 only 9 of the 37 countries studied had lower birthrates than the United States. The French birthrate is no longer declining rapidly and in fact exceeds the German rate.

A decreasing birthrate means an ever decreasing proportion of youth and vigor in the population, the statisticians point out, with the old and dependent forming a larger part.

Science News Letter, January 26, 1935

FIELDS

SEISMOLOGY

Grand Canyon Region Shaken by Local Quake

GRAND Canyon National Park has experienced since the first of the year a series of local earthquakes, some of them severe enough to awaken sleepers and break windows.

The local disturbance is probably confined to the Bright Angel geologic fault which crosses the Grand Canyon. The country west of the escarpment is known for an earthquake region for fifty miles. The Grand Canyon area, however, cannot be counted as a major seismic region, since recorded shocks have not been destructive. The quakes of the recent past have been the first in twenty years. Two others recalled by old-timers occurred in 1904 and 1914.

The Grand Canyon earthquakes, present and past, have had practically nothing to do with the formation of the Grand Canyon itself. A remark often heard from awe-stricken visitors is, "What a tremendous upheaval in nature it must have taken to create this great gash in the earth!" In point of fact, the Grand Canyon was formed very slowly and very quietly. Every inch of its mile of depth was worn by the water of the Colorado River, rolling rocks and pebbles along its bottom, through many hundreds of thousands of years. The slow rising of the Arizona plateau was no doubt accompanied by many earthquakes; but it was the river, and only the river, that carved the Grand Canyon of Arizona.

Science News Letter, January 26, 1935

ARCHAEOLOGY

Rickets May Have Ruined First New World Colony

THE New World, discovered and colonized by Europe five hundred years before Columbus, was lost again because of rickets, modern archaeological excavations in Greenland suggest.

At Herjolfsnes, on the lonely Greenland coast, several skeletons of Viking women, disinterred and studied by Prof. F. C. C. Hansen of Copenhagen, exhibit severe pelvic deformations. The abnormalities are due to osteomalacia, (rickets in its severe form), according to Dr. J. Preston Maxwell, British physician and professor of gynecology at the Union Medical College at Peiping, China. By inhibiting reproduction among the settlers, this disease changed the course of history, Dr. Maxwell suggests. (*American Anthropologist*, July-September, 1934)

The Greenland colony was founded in 985 A.D., by Eric the Red. It was Eric's son, Leif the Lucky, who discovered "Vinland," thought to have been perhaps Massachusetts.

The Greenland settlements lasted five centuries. An independent state at first, they finally became a Norse colony. Scandinavian ships maintained a busy commerce there, trading European wares for New World walrus ivory. Great stone churches were erected; cattle were imported; and new local industry began.

Clothing styles dug up by archaeologists in Herjolfsnes show how close and continuous the European contact was for a while. Then, at last, for some mysterious cause, decline set in. The population died. Houses fell into ruin. Grass and willow grew over them. Finally Eskimos settled at the sites. The Norse ships stopped coming, no one knows when, or why.

Science News Letter, January 26, 1935

CONSERVATION

Ducks Scarce in Mexico, U. S. Scientists Learn

WILD ducks are scarce in Mexico, no less than in this country. Investigators of the U. S. Biological Survey, who are studying certain duck species that nest in the United States and Canada and winter in Mexico, have learned from Mexican sportsmen, as well as from their own observation, that the serious duck shortage felt for some years in this country has its close reflection in our next-door neighbor on the south.

One substantial step in the conservation of wildfowl has been taken by the Mexican government. For many years Mexican pot-hunters have made use of a device known as an "armada"—a whole battery of shotguns mounted on a frame, aimed and fired as a single weapon. One broadside from this murder-machine could wipe out hundreds of ducks. The use of the "armada" is now forbidden.

Science News Letter, January 26, 1935

METEOROLOGY

Dust Storm Menace Looms, Weather Bureau Warns

DUST STORMS, choking the air and blinding the sun, may come whirling out of the Northwest at any time, the U. S. Weather Bureau warns. The soil throughout the drier western part of the Great Plains region, from eastern Montana and the western Dakotas down to eastern Colorado and western Nebraska, is still in a state of unrelieved drought, and bare of snow.

Whether such storms might repeat the performance of the famous dust storm of last spring, which swept across the entire East and reached the sea, Weather Bureau scientists would not venture a prediction.

The one thing that might prevent the menace of dust storms in the West, said J. B. Kincer, Bureau meteorologist, is timely rain or snow. But there is little expectation of that in the Western dry area now until March or early April.

Science News Letter, January 26, 1935

ECOLOGY

Plants Moved to Mountains Don't Become New Species

RADICAL changes in dwelling-place do not force plants into correspondingly radical changes in form. Plants carried from mountain-top to sea-level, or vice versa, do change their appearance but they do not change their identity, Dr. David D. Keck of the Carnegie Institution of Washington, told a botanical audience at the meeting of the American Association for the Advancement of Science.

The experiments were carried out between California mountain tops and the sea, and were undertaken partly with the objective of finding out whether plants carried to altitudes quite alien to them in nature would respond by turning into new species. Such proved not to be the case. The plants underwent modifications in external form and internal structure that were frequently striking and remarkable, but such changes did not become permanently incorporated into their hereditary make-up, and when they or their descendants were transplanted back to the original environment the changes were soon reversed, leaving the plants in their original state.

Science News Letter, January 26, 1935

ASTRONOMY

Watch for Eclipse

On Sunday Morning Just at Church Time, Preachers Will Have Competition for Attention in Heavens

By JAMES STOKLEY

AN ECLIPSE of the sun, the first seen in the United States since the famous one of August, 1932, is the feature event on the February celestial program, and is scheduled for Sunday morning, February 3. But no parties of foreign astronomers have come to our shores to observe this one, as they did three years ago. The reason is that this is not total, but partial. The moon will not completely cover the sun as seen from any part of the earth. It is only at a total eclipse, when the moon goes squarely in front of the solar disk, that astronomers can make the observations that give an eclipse its value.

Despite its slight scientific interest, however, the eclipse on February 3 will be an interesting spectacle, and will afford keen competition to the preachers on that morning. It will be visible from all parts of the United States, in fact from all of North America except Alaska, but west of the Rocky Mountains it will be so early in the morning that the eclipse will have started when the sun rises. In Texas it will begin about 8:30 a. m., Central Standard Time. Along a line from northwestern Florida to North Dakota, it will start about half an hour later. At 10:30 a. m., Eastern Standard Time, it will start for people living along a line from Washington to the Great Lakes, while the good folks of Maine will not be able to begin their observations until 10:45 a. m. It will last about an hour to an hour and a half, the duration increasing the farther one goes to the northwest.

Protect Your Eyes

Remember that it is always unsafe to look at the sun with the unprotected eye, and so if you are going to watch the eclipse provide yourself with some sort of screen. The traditional smoked glass is satisfactory, but better and more convenient for most of us is a dense piece of exposed and developed photographic film. Until the eclipse starts, the sun will look as it does at any time. Then, as you watch, a little nick will appear in the sun's edge, and will gradually get larger and larger. This is the edge of the moon, about 227,000 miles from the earth, about a four-hundredth of the sun's distance of some 92,000,000 miles. At a point in British Columbia, where the sun will be seen most eclipsed, about 74 per cent. of its diameter will be covered, while over most of the United States about half will be hidden.

Photographing an Eclipse

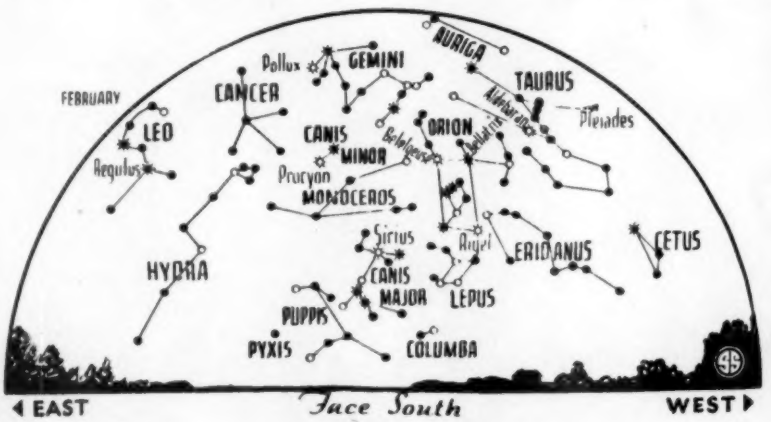
An interesting photograph showing the progress of the eclipse can be made with an ordinary camera. Set the camera on a tripod, or some other firm support, pointed to the southeast, and directed so that the sun will appear in the lower left hand corner of the final picture. The diaphragm should be shut down to the smallest opening, and, if you have it, a filter placed over the lens to reduce further the sun's light. Set the shutter to an exposure of a hundredth of a second or even less. Then take one picture just before the time of begining of the eclipse. Do not move the camera or change the film, but make another exposure ten minutes later, and every ten minutes until the eclipse is over. Your finished picture will then show a series of suns, at various stages of the eclipse. If your camera is equipped with a focal plane shutter, take care not to point it at the sun unless the lens opening is already reduced, or you may burn a hole in the shutter curtain.

Third of Year's Seven

This eclipse is the third of the seven that occur during 1935, a year in which we are having the greatest number ever possible in a single year. Two of these are of the moon and five of the sun. The last time this occurred was in 1805, and it will not happen again until 2485. In 1917, however, there were three of the moon and four of the sun. This happens more often than the combination that we experience this year. In a large book written half a century ago by an Austrian astronomer, Theodor Ritter von Oppolzer, all the eclipses from 1207 B.C., to 2161 A.D. are listed. Only 48 of the years during this period have seven eclipses, and only 14 of them have the two moon, five sun combination. The other 34 have the three of the moon and four of the sun. No other combination is possible.

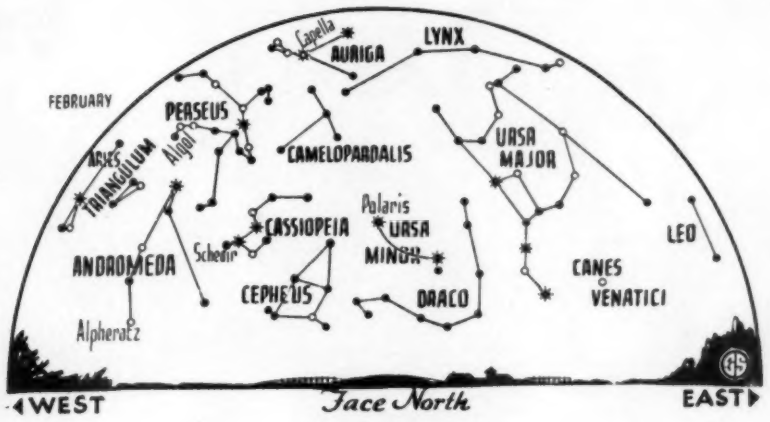
During the month of February the moon is new on the third of the month, at first quarter on the 10th, full on the 18th and at last quarter on the 26th. On February 3, it will also be closest, or at perigee, with 226,950 miles separating it from the earth. Apogee,

✲ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



LEO THE LION

Low in the east, this constellation is now coming into the evening sky.



NO PLANETS

The later evening hours are devoid of these bright bodies, but look low in the southwest during the gathering twilight for Mercury and Venus.

when the two bodies are farthest, comes on the 17th, and then we shall be 252-,500 miles away. New moon is on Feb. 3 at 11:27 a. m., E.S.T.; first quarter on Feb. 10 at 4:25 a. m.; full moon on Feb. 18 at 6:17 a. m., and last quarter on Feb. 26 at 5:14 a. m.

During the month of February, Orion and its brilliant neighbors are again the principal spectacle in the evening skies. Orion himself, the great warrior, is to the south, and is easily recognized from the three stars forming his belt, with the bright star Betelgeuse above and Rigel below, the former in his shoulder and the latter in a foot. To Orion's left are two very prominent stars, Sirius, the dog star in Canis Major, the greater dog, the nearer and lower, and Procyon, in Canis Minor. Sirius is the most brilliant star in the heavens, and the closest seen from the United States, unless one can look through a telescope at one of three other stars which are closer but not visible to the naked eye. Above Procyon is the group of Gemini, the twins, with the two stars Castor and Pollux, the latter the brighter and lower.

Six Pleiades Visible

In the zenith shines Capella, part of Auriga, the charioteer. Below, to the southwest, is Taurus, the bull. The brightest star in this group is Aldebaran, which marks the animal's eye, and is part of a V-shaped group of fainter stars, the Hyades, outlining his face. Farther west, in his shoulder, is a famous little cluster of stars, the Pleiades, of which six are usually visible to the unaided eye.

Directly east, Leo, the lion, is now coming into the sky. In this group is seen the "Sickle," a group of six stars shaped like that implement, with the first magnitude star Regulus at the bottom, marking the end of the handle. To the northeast is the Great Bear, Ursa Major, in which is the familiar "Big Dipper," the handle hanging downwards. In a similar position to the northwest is Cassiopeia, the queen, the stars arranged in the shape of the Greek letter sigma, or a W on one side. Very low in the northwest Deneb may be glimpsed, part of Cygnus, the swan, but the rest of the constellation is only visible early in the evening, and is not shown on the maps.

No Planets to Watch

No planets are visible this month during the evening hours for which the maps represent the skies, but several are to be seen earlier or later. On February 1 Mercury is at its greatest distance east of the sun, and sets about an hour later, so for a day or two at that time it may be glimpsed in the gathering twilight in the southwest. When one looks for Mercury, Venus will also be observed. It is farther from the sun, setting about an hour and three quarters after sunset, and is much more brilliant than any of the other stars or planets. During the coming months it will become more and more conspicuous in the western early evening sky. It is in the constellation of Aquarius, the water carrier.

At about 10 p. m., the red planet Mars appears in the east, in the group of Virgo, the virgin. Its red color leaves little doubt as to its identity. Jupiter, now in Libra, the scales, rises about midnight, and is more brilliant than Mars. Saturn this month is close to the sun, and cannot be seen.

AERONAUTICS

Stratosphere Balloon Ripped Because Fabric Stuck

BECAUSE the giant stratosphere balloon, Explorer, on its ill-fated flight in July had the lower part of its rubber-sticky fabric tucked up inside the balloon, great tears occurred which brought a precipitate ending to the flight.

This is the finding of a scientific inquiry as to the cause of the accident made by a board of review consisting of Dr. L. J. Briggs, Chairman, National Bureau of Standards; Dr. John O. La Gorce, National Geographic Society; Brig. Gen. O. Westover, U. S. Army Air Service; Dr. W. F. G. Swann, Bartol Research Foundation; and Dr. L. B. Tuckerman, National Bureau of Standards; as reported by Dr. Briggs and Dr. Tuckerman.

Rubberized Fabric Stuck

It is as though the Explorer were an agile young lady of the skies, who to be unencumbered for a great leap upwards had reefed up her skirts out of the way, only to find that when she needed them they tore asunder.

To avoid difficulty in inflation and launching, great folds of fabric that would not be expanded by gas until the balloon had risen about 60,000 feet in its 75,000 foot projected climb were accordion-folded inside, with the idea that as the bag increased in size in the rarefied atmosphere it would come loose neatly. But the designers did not realize that the new way of folding would not allow the adherent rubber-coated fabric to peel loose, as happens with the usual methods of folding. The inside layers became taut first, setting up shearing stresses that broke the fabric. So at 60,000 feet the tears began and forced a descent.

Hydrogen Exploded

An explosion of the lifting hydrogen gas mixed with air oxygen admitted by the torn balloon was the final act in the disaster and caused the disintegration of the balloon. The three Army officers scrambling for parachute jumps from the gondola below heard no explosion. Set off by a spark of static electricity, the explosion took from 5 to 6 seconds, Dr. Tuckerman estimated, and its low rumble was masked by the sound of the motor of an airplane flying nearby. This explosion disintegrated the up-

per portion of the balloon and allowed the remains to fall freely 3000 feet to the earth.

Drs. Briggs and Tuckerman are sure that the cause of the ripping can be eliminated if future stratosphere balloons are built for another try under the auspices of the National Geographic Society and the U. S. Army. The lower portion of the balloon, for instance, might be folded outside instead of inside, as in older balloon practice, and the difficulties in inflating and launching overcome by a different method of handling.

Science News Letter, January 26, 1935

MEDICINE

Serious Heart Diseases Caused by External Nerves

VENTRICULAR fibrillation, a fatal heart condition, and auricular fibrillation, also a grave cardiac disorder, have been found to be caused by the external nerves of the heart, it is indicated by the researches of Drs. Louis H. Nahum and H. E. Hoff of the faculty of the Yale School of Medicine. Dr Nahum reported on his work to the New Haven Medical Association, of which he is the retiring president.

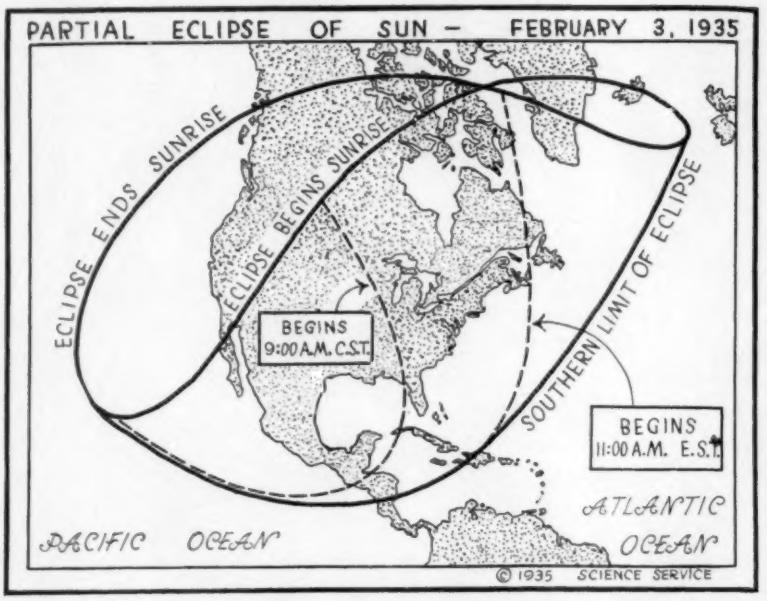
In normal hearts, Dr. Nahum explained, the external nerves, the vagus and accelerator, regulate the beat, but in abnormal hearts, it is these nerves acting with other agents that bring about fatal rhythms.

In cases of benzol or chloroform poisoning, and electric shock, it is the accelerator nerve, together with adrenalin liberated by the glands, that cause changes from the normal heart beat to the ventricular fibrillation, Dr. Nahum said. This fatal heart beat can be prevented by removing the accelerator nerve from the heart and excising the adrenal glands, Dr. Nahum found.

The vagus nerve, on the other hand, was found to promote auricular fibrillation. In the presence of an excess of thyroxin, from the thyroid gland, as in certain goiter patients, or in the case of electric shock, the vagus nerve, according to Dr. Nahum, becomes over-active and instead of following its usual role of slowing the heart, brings on the irregular auricular fibrillation.

Science News Letter, January 26, 1935

The Island of Jersey has systematically standardized its famous herds, prohibiting importation of any cattle since 1763, or about 40 generations of cattle.



FRONTIERS OF THE SHADOW

When the sun goes into partial eclipse on the first Sunday in February, it will be partly hidden by the moon within the limits and times as indicated on the map. You can figure the approximate time for your own location by interpolation.

ASTRONOMY

Study of Nova Hastened Before it Fades Again

FROM observatories throughout the world, astronomers are hurrying the study of Nova Herculis, the exploding star that shone so brightly just at Christmas time.

Their hurry is a race with stellar happenings on the distant star that blew up; a race which will be lost if the star fades to its former insignificance in the heavens. At Christmas time Nova Herculis was so bright that only sixteen stars in all the sky were more luminous. Now it has faded out somewhat and rapid work is necessary to obtain information about it before it dies out completely.

From the international clearing house for stellar data at the University of Copenhagen, Science Service has received reports obtained at observatories at Warsaw, Poland; Moscow, U.S.S.R.; and Stockholm, Sweden, which were interpreted by Dr. Donald H. Menzel, astrophysicist of Harvard College Observatory.

The Soviet measurements indicate Nova Herculis is still blowing itself apart. Material blown off from the star in its eruption is spreading out with a velocity of 625 miles a second.

From Stockholm observations on the brightness of Nova Herculis show the star went through a period of fluctuating luminosity. Recently the brightness magnitude was 2.5. Three days later its light was weaker, at 3.3 magnitude. And the following day its magnitude was back to 2.8.

The weakened intensity was attributed on this occasion to strong absorption of the star's light by cyanogen molecules composed of two atoms each of carbon and nitrogen. As the star regained brightness the absorption of these cyanogen molecules diminished.

The expansion velocities of 625 miles a second reported from the Moscow observatory need to be considered in comparison with observers elsewhere, Dr. Menzel pointed out.

"Emission lines of the star bordering the absorption lines showed velocities of approach of the order of only 150 miles a second," Dr. Menzel indicated. Velocities of approach are generally interpreted as the velocity with which the material blown off from the star is approaching the observer in the line of sight.

Science News Letter, January 26, 1935

PSYCHOLOGY

Twin-Training Experiments May be Great Historic Event

FIFTY or five hundred years in the future the fifteen-month-old girl twins, Florie, the athletically trained, and Margie, the untrained, (*SNL., Jan. 19, p. 36*), may be considered as ushering in not only a new scientific era but a new period of ability of the human race to manage human affairs.

Dr. John Dewey, the philosopher and father of progressive education, made this prediction after seeing Dr. Frederick Tilney and Dr. Myrtle McGraw put Florie and Margie through their paces at Babies Hospital in New York City recently.

"Man knows less about himself than anything else in the world," Dr. Dewey said. "He has penetrated far into the secrets of physical nature and he has managed and directed the powers of nature, but he shows a great lack of ability to manage the affairs of mankind."

Special psychological training as demonstrated by Florie and Margie, the earlier case of Jimmy and Johnny, and over sixty other children, has great possibilities of giving some insight into just how human behavior develops, Dr. Dewey said.

The brain studies by Dr. Tilney paralleling the behavior research of living children were cited by Dr. Dewey as a unique approach to understanding the complex mental machine that controls the human organism.

Dr. Tilney found that the brain must be ripe, as he calls it, for utilization in a particular way, so that no matter how well trained a baby is, it cannot be made to walk if the proper brain cells have not developed to the proper stage, as they usually do at about a year.

Working with hormones, Dr. Earle T. Engle found similarly that even though cells were fully developed they did not respond to gland secretion until they were ready or ripe.

Science News Letter, January 26, 1935

SECOND PRINTING

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ARCHAEOLOGY

Strong Fortress of Incas Unearthed in Peru

WHAT a medieval American fortress was like, in the days of the Incas in Peru, is shown by excavations of archaeologists of the Peruvian National Museum, at Lima.

The fortress of Sacsahuaman, now uncovered from four centuries of accumulated earth, reveals that Incan warriors lived and fought in stone forts as cunningly planned and constructed as medieval castles of Europe's knights.

The Incan fortress was levelled by Pizarro's men in the Spanish Conquest days and since then only hearsay has told what the famous place was like. The fort served as the Incan capital in time of war. It stood on a hill on the outskirts of Cuzco, peacetime capital of the Incan Empire. Incan kings took refuge in the fort and there they hid the Sun God's gold.

Excavations directed by Luis Valcarcel reveal the old defense walls.

On three sides, where it is very steep, a single circumvallating stone rampart suffices. The fourth side, easy of ascent, is guarded by three walls, one within the other, each at a higher level, and very strangely planned. The walls zig-zag in twenty-three sharp angles across the entire way of approach. In bird's-eye view, these walls suggest some Peruvian zig-zag pottery design. But they had this odd shape for stability.

Wide avenues and moats separate the walls, but they connect at certain places through doors which closed by means of movable stone blocks. The zig-zag bulwarks are constructed of enormous blocks, the largest about 20 feet long and weighing many tons.

These walls, built without cement, are marvels of brute force. The quarry from which the rock must have come is miles away over mountains. The legend of the "Tired Stone," an uncut boulder half way down the slope, reflects on Indian labor methods. Thousands of Indians hauling on ropes, according to the story, could not make the grade. The stone sweated blood in the effort.

A marble "vanity case," with vermillion, blue, and yellow face colors still in it, just as it was dropped and broken by some last defender of Sacsahuaman, was among the numerous articles found in the earth covering the ruins. The marble block had six cylindrical compartments for holding face paint, with lids to cover them.

Incas manning Sacsahuaman in its last days no doubt esteemed the wool-giving llama highly. Many figures of these animals carved in stone were found in the debris. T-shaped copper axes were also present in great numbers.

Science News Letter, January 26, 1935

ENGINEERING

Rolling Supplants Casting In Making Giant Flywheel

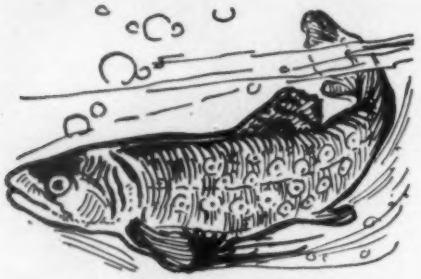
ROLLING supplants casting in the fabrication of the rims for hydroelectric turbines such as the one General Electric Co. is building for the Kanawha Valley Power Company in Virginia. Twenty-seven feet long and weighing fifteen tons, the giant slab of white-hot metal is being rolled into semicircular shape. Formerly such large structures were cast to their half-circle design.

Science News Letter, January 26, 1935

CONSERVATION

NATURE RAMBLINGS

by Frank Thone



Maldistribution of Water

MALDISTRIBUTION of wealth is causing a good deal of excitement these days in legislative circles, and may be expected to cause a good deal more. But maldistribution and maladministration of wealth is only one of the harms our national body is heir to, and perhaps not the worst of them when you get right down to the bottom of things.

For wealth is visibly expressed in pieces of yellow and white metal, and in printed and written slips of paper; all of which are intrinsically almost useless, and much of which may represent only imaginary money at that. Since this kind of wealth is so largely a matter of mass mental attitude, its evils can be corrected, sometimes at any rate, by changes in the mass mind, whether through legislative fiat or by the restoration or destruction of "confidence."

But the wealths that enter into our actual needs—shelter and food, clothing and fuel—are tangible, material things, and their manipulation affects us physically and directly, for better or worse.

Of all our national wealths, probably the least regarded has been water. Except in arid regions, we have taken water as much for granted as we have air. This is especially unfortunate, for of all our national wealths it is quite literally the most fluid circulating medium. When we waste it through floods or useless runoff from our fields, or debase it with sewage and industrial wastes, or overconcentrate it in narrow channels and thereby cause erosion, we do much more mischief to ourselves than by any imaginable maladministration of the monetary system or the industrial securities setup.

Threatening national crises in a score of such neglected aspects of water use are reviewed in the report, just issued, of the Water Planning Committee of President Roosevelt's National Planning Board. After a comprehensive survey of the national uses of water, this group of scientists, economists and engineers recommend certain far-reaching reforms which may take years to work out but which, once effected, will promote national welfare for centuries.

This does not mean a too-Herculean effort to iron out water inequalities. Inequalities in water-wealth are obviously more nearly inevitable than inequalities in money-wealth. Tennessee can always expect a larger income of rain than falls to the lot of Nevada. But the maladministration of greater Eastern water-wealth has brought a large share of the very ills that most afflict us, and right planning with maintained administration, can remedy this maladministration and make the inequalities a source of national well-being rather than national woe.

To this problem the new report directs our attention, and to this end the efforts of the present and coming Congresses may be expected to be directed.

Science News Letter, January 26, 1935

●RADIO

Tuesday, January 29, 4:30 p. m.

DIGGING UP HISTORY, by Horace H. F. Jayne, Director of The University Museum, Philadelphia.

Tuesday, February 5, 4:30 p. m.

WHEN THE PAST BROKE ITS SILENCE, by Prof. E. A. Speiser, Department of Semitics, University of Pennsylvania.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

PUBLIC SAFETY

Accidents Killed 99,000 Persons During 1934

NINETY-NINE thousand people died in 1934 from all kinds of accidents. This is the preliminary report of the National Safety Council, nationwide clearing house organization for the study of accidents and their prevention.

The accidental death figure for the last year is an increase of 8.7 per cent. over 1933, when 91,087 died from accidental causes. The total for 1934 approaches the all-time record of 99,300 deaths in 1930.

In "win" position, leading the race with death, are traffic accidents, accounting for over one-third of all the fatalities. "Place" position goes to home accidents, causing another third of the total. "Show" position is held by occupational and public accidents.

Win, place or show, the unenviable leaders maintain the same positions of the past. Motor vehicle accidents killed 35,500 people; up 13 per cent. from 1933.

Home accidents were up ten per cent. from 30,000 in 1933 to 33,000 in 1934.

Occupational accidental deaths are estimated at 15,500; up 1,000 over 1933.

The increase in traffic deaths is only partially accounted for by increased motor travel, reports the National Safety Council. Gasoline consumption—best index of travel—increased only 7 per cent. in 1934; yet traffic deaths climbed 13 per cent.

While motor accidents increased generally throughout the country, four large cities achieved the notable feat of decreasing deaths from this cause within their boundaries. The honor roll includes: San Francisco, a drop of 15 per cent. from 1933 totals; Pittsburgh, down 13 per cent.; Milwaukee, down 8 per cent. and New York City, down one per cent.

Science News Letter, January 26, 1935

INVENTION

New German Envelope Sticks Without Licking

ENVELOPES that need no licking or other moistening of the flap to make them stick securely have been produced by a German inventor. The body of the envelope bears a secondary gummed flap which can be turned up after the letter has been inserted, so that its sticky surface and that of the principal flap meet. A momentary finger-pressure, and the two surfaces stick tightly to each other.

Science News Letter, January 26, 1935

•First Glances at New Books

Additional Reviews On Page 64

Geography

THE SEARCH FOR THE NORTHWEST PASSAGE—Nellis M. Crouse—*Columbia Univ. Press,* 533 p., map. $4. Passing quickly over early attempts to solve one of the great navigation puzzles of the Far North, the author gets to the subject of the book—the nineteenth century voyages, and the successful voyage of Amundsen, in 1905. With Amundsen, says the author, ended the epic of the Northwest Passage, that began four centuries earlier when John Cabot left England on his great quest.

Science News Letter, January 26, 1935

Engineering

INDEX TO A. S. T. M. STANDARDS AND TENTATIVE STANDARDS—*American Soc. for Testing Materials,* 142 p., free.

Science News Letter, January 26, 1935

Ethnology

TAMING PHILIPPINE HEADHUNTERS—F. M. Keesing and Marie Keesing—*Stanford University,* 288 p., $2.75. A quarter of a million mountain and jungle inhabitants, the so-called "non-Christian" peoples, are the colonial problem of the Philippines. Choosing mountaineers of northern Luzon as a sample cross-section, the authors have described what they could learn from official records and observation. The authors conclude that these people can be "culturally harmonized" with the wider values of Filipinism, and that Filipinos of recent years have stood the cultural test of treating a less civilized minority group with very fair credit to themselves. The Institute of Pacific Relations sponsored the study.

Science News Letter, January 26, 1935

Art—Ethnology

A DESCRIPTIVE AND ILLUSTRATIVE CATALOGUE OF MINIATURE PAINTINGS OF THE JAINA KALPASUTRA, AS EXECUTED IN THE EARLY WESTERN INDIAN STYLE—W. Norman Brown—*Smithsonian Institution,* 65 p., 45 plates, $1. paper, $1.50 cloth. Freer Gallery of Art, Oriental Studies, No. 2. Numerous paintings from the Kalpasutra, religious manual of the white-clad Jains of India, are reproduced in black and white in this volume, with explanatory comment. Prof. Brown has selected the illustrations from fourteen paper manuscripts, the oldest dating from 1460 A.D.

Science News Letter, January 26, 1935

Library Science

AIDS IN BOOK SELECTION FOR SECONDARY SCHOOL LIBRARIES—Edith A. Lathrop—*Govt. Print. Off.,* 28 p., 5c. U. S. Office of Education Pamphlet No. 57.

Science News Letter, January 26, 1935

Physiology

THE HUMAN MACHINE, ITS USES AND ABUSES—Lorena M. Breed—*Stratford,* 101 p., $1.50. Simply written and interesting information for the layman on certain aspects of physiology and nutrition.

Science News Letter, January 26, 1935

Public Health

SIXTEENTH ANNUAL REPORT FOR THE YEAR ENDING SEPTEMBER 30, 1934—*The Commonwealth Fund,* 81 p., free.

Science News Letter, January 26, 1935

Physiology

THE PHYSICAL AND MENTAL GROWTH OF PREMATURELY BORN CHILDREN—Julius H. Hess, George J. Mohr, and Phyllis F. Bartelme—*Univ. of Chicago,* 449 p., $5. A tremendous amount of valuable information, collected from case histories and careful study of nearly 2,000 prematurely born children, is here made available for medical scientists and others concerned with child welfare.

Science News Letter, January 26, 1935

Psychiatry

TRAINING IN PSYCHIATRIC SOCIAL WORK—Sarah H. Swift—*Commonwealth Fund,* 177 p., $1.75. The methods and results obtained at the Institute for Child Guidance are here described and will doubtless be of interest and value to other organizations faced with the task of training psychiatric social workers.

Science News Letter, January 26, 1935

Medicine

DIABETIC MANUAL FOR PATIENTS. 2nd ed.—Henry J. John—*Mosby,* 232 p., $2. This revision of Dr. John's valuable and practical book reflects the modern trend toward more liberal use of carbohydrates in diabetic diets.

Science News Letter, January 26, 1935

Dynamics

DYNAMICS OF EARTH AND OTHER MACROSCOPIC MATTER—John H. Griffith—*Iowa Engineering Experiment Station,* 152 p., free.

Science News Letter, January 26, 1935

Astronomy

A LABORATORY MANUAL OF ASTRONOMY—Hazel M. Losh and Robert M. Petrie—*George Wahr, Ann Arbor,* 41 p., 5 maps, 75c.

Science News Letter, January 26, 1935

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Additional Reviews On Page 68

Linguistics

COMPARATIVE FREQUENCY LIST: A STUDY BASED ON THE FIRST THOUSAND WORDS IN ENGLISH, FRENCH, SPANISH AND GERMAN FREQUENCY LISTS—Helen S. Eaton—*International Auxiliary Language Assn., New York,* 277 p., 25c. This compilation may well be the beginning of simpler and more effective language learning. The thousand words plus fundamental grammar should make a person somewhat articulate in a foreign speech.

Science News Letter, January 26, 1935

Economics

THE BATTLE FOR DEMOCRACY—Rexford Guy Tugwell—*Columbia Univ.,* 330 p., $3. A compilation of the writings and speeches of the Under-Secretary of Agriculture which constitute an introduction to his philosophy, both economic and political. The influence of science on the social organization is evaluated in a chapter under the title "The Social Responsibility of Technical Workers."

Science News Letter, January 26, 1935

Economics

LETTER TO THE PRESIDENT ON FOREIGN TRADE—George N. Peek—*Chemical Foundation,* 13 p., free. Letters to President Roosevelt on the subject of foreign trade, written by George N. Peek, giving an international balance sheet of our foreign trade over a long period of years, are here reprinted by the Chemical Foundation under the title "A Great Constructive Contribution to the First of the Sciences by the President of the United States" with the quotation on the cover "Remember, O Stranger, Arithmetic is the first of the sciences and the mother of safety."

Science News Letter, January 26, 1935

Economics

THE THIRTY-HOUR WEEK—Harold G. Moulton and Maurice Leven—*Brookings Institution,* 20 p., 15c. "This analysis of the economic effects of the thirty-hour week clearly leads to the conclusion that the measure would not promote national welfare. It would prove detrimental to the interests of labor as well as other classes. It would not promote recovery and bids well to intensify the depression. At best its immediate effects would be a spread of employment at the expense of efficiency and productive output. In its long-run implications the measure offers to the workers of the country merely a choice between more leisure and a more abundant consumption of goods and services."

Science News Letter, January 26, 1935

Medicine

BIRTH CONTROL, ITS USE AND MISUSE—Dorothy Dunbar Bromley—*Harper and Brothers,* 304 p., $2.50. Dr. Robert L. Dickinson, secretary of the National Committee on Maternal Health, has written an introduction for this unusually frank and temperate discussion of birth control. The author gives the opinion of various medical authorities on the need for birth control and also as to the efficiency of the various methods. The related problems of abortion and sterility are also discussed.

Science News Letter, January 26, 1935

Medicine

ALLERGY—Warren T. Vaughan—*Mosby,* 420 p., $5. Although the first edition of this text is only three years old, so much has been added to knowledge of the subject that Dr. Vaughan found it necessary to revise the volume completely for this second edition. The book is written as much for allergic sufferers as for physicians. The complex subject is explained clearly and interestingly and there is a wealth of practical, helpful information to supplement the physician's instructions to his patients. Persons suffering from food allergies will particularly welcome the dietaries and recipes.

Science News Letter, January 26, 1935

Poetry

SPIN DANCE, AND SPRING COMES TO SHAW'S GARDEN — Paul Southworth Bliss. Linoleum blocks by Harold J. Matthews—*Lakeside Press,* 98 p., $2.50. A new book of nature lyrics by the author of "The Arch of Spring." Mr. Bliss' ability to find time as well as local inspiration for composition during odd moments in his task as an F. E. R. A. field agent in North Dakota marks him as an invincible poet.

Science News Letter, January 26, 1935

Dermatology

SKIN DEEP, THE TRUTH ABOUT BEAUTY AIDS—SAFE AND HARMFUL—M. C. Phillips—*Vanguard Press,* 254 p., $2. Here is a lively de-bunking of the cosmetic industry by one of the staff of Consumers' Research. The woman who wants a safe and reasonably-priced cosmetic product—rouge, powder, hand-lotion or what—will find much valuable as well as amusing information here. As usual in publications by Consumers' Research, a spade is called a spade and products are called by their trade names. The last chapter tells of efforts to protect the cosmetic consumer through state laws and suggests what women's clubs can do about the situation.

Science News Letter, January 26, 1935

Dietetics

THE PRACTICE OF DIETETICS—L. H. Newburgh and Frances Mackinnon—*Macmillan,* 264 p., $4.00. This is a distinctly different book on dietetics in that it is not a compilation of ready-made diets, menus and recipes for various conditions. Instead, it discusses fundamental facts of nutrition particularly in relation to disease, seeking in this way to guide the physician or dietitian in his or her task of making up suitable diets and menus for the individual patient. Too technical for the lay reader, but suitable for medical student, dietitian and the practicing physician wishing to keep abreast of modern knowledge of nutrition and diets.

Science News Letter, January 26, 1935

Physiology

THE VITAMIN B REQUIREMENT OF MAN—George R. Cowgill—*Yale Univ.,* 261 p., $4. A report of valuable researches on a phase of human nutrition.

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Geography

ECONOMIC GEOGRAPHY (Third Edition)—R. H. Whitbeck and V. C. Finch—*McGraw-Hill,* 565 p., $3.50. The third edition of a college textbook by two professors at the University of Wisconsin.

Science News Letter, January 26, 1935

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